REMARKS

The Office Action dated November 17, 2004 (Paper No. 20041108) has been received and the Examiner's comments carefully reviewed. Prior to entry of this paper, Claims 1-20 were pending. Claims 1-3, 5, 15, 18, and 20 were rejected. Claims 4, 6-14, 16, 17, and 19 were objected to, but were identified as being allowable if re-written in independent form. In this paper, Claim 4 has been amended to correct an informality, and new claims 21-25 have been added. No new matter has been added. Claims 1-25 are currently pending. For at least the following reasons, Applicant respectfully submits that each of the presently pending claims is in condition for allowance.

Rejection to Claims 1-3, 5, and 20 under 35 U.S.C. § 103(a)

Claims 1-3, 5, and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Myers (U.S. Patent No. 5,184,127) in view of Wang et al. (U.S. Patent No. US 6,535,156). The rejection is respectfully traversed.

It is respectfully submitted that the rejection is improper at least because a prima facie of obviousness has not been established. First, it is respectfully submitted that there is no motivation to modify Myers in the manner proposed by the Office Action. Second, it is respectfully submitted that the combination of Myers and Wang proposed by the Office Action would render the prior art being modified (the circuit of Myers) unsuitable for its intended purpose.

Myers describes a droop compensation circuit. In a calibration mode, a slope of a ramp signal is calibrated for droop compensation. During normal operation (steady state mode), sample-and-hold circuit 20 (of FIG. 1 of Myers) performs a sample-and-hold operation on the video input signal. The held video signal is summed with the calibrated ramp signal to compensate for droop in the held voltage. The droop-compensated voltage is converted into a digital signal by subranging analog-to-digital conversion. (See Col. 1, line 63 through Col. 3, line 67 of Myers).

During the calibration mode of Myers, first, normal sample-and-hold timing is employed. The calibration DAC 13 of Myers provides an output reference to the input of the sample-and-hold circuit 20, and the slope of ramp generator 19 is initialized at zero. Next, an extended hold time is

employed. Error signal E is then provided as V1 (the output of the coarse quantizer Q1 during the normal sample-and-hold timing) minus V2 (the output of the coarse quantizer Q2 during the extended sample-and-hold timing). The error signal E represents the amount of change in the hold output that takes place over the time interval defined by the delay in the Q1 strobe relative to the normal Q1 strobe timing. (See Col. 4, lines 4-63 of Myers).

The input of droop compensation DAC 15 of Myers is adjusted to produce the ramp signal based on error signal E for canceling droop of the held voltage. Error signal E is iteratively re-calculated and the ramp signal changed based on the new value of the error signal E until the error signal E has been reduced to the resolution limit of the coarse quantizer Q1. The process is a coarse calibration of the ramp signal to compensate for droop. (See Col. 4 line 64 though Col. 5, line 9 of Myers). The calibration is calibration of the ramp signal for droop compensation; it is not calibration of the analog-to-digital conversion.

After the coarse calibration of the ramp signal is complete, the residue of the coarse quantization (modified by the ramp signal) is provided to the fine quantizer Q2 to perform fine calibration for the ramp signal. (See Col. 5, lines 10-22 of Myers). The determined coarse and fine calibration values are used during normal operation for providing the ramp signal while the video input signal is converted to a digital signal through subranging A/D conversion. (See Col. 2, lines 67 through Col. 3, line 67 of Myers).

The Office Action states that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the folding fine channel taught by Wang et al. into final channel of Myers for the purpose to provide finer measurement resolution because each measurement regions is resolved into n different levels."

However, it is respectfully submitted that this is not a motivation to modify Myers as suggested in the Office Action, because the circuit of Myers already resolves each measurement region into n different levels. In Myers, subranging analog-to-digital conversion is employed. See column 2, lines 1-2. Subranging analog-to-digital conversion is a two-stage process: a coarse stage

first, followed by a fine stage which happens after the coarse stage. In Myers, the coarse quantization is performed, and a residue of the coarse conversion (as modified by the ramp signal) is obtained, where the residue represents the quantization error of the coarse conversion. The fine quantizer Q2 quantizes the residue of the coarse quantization. (See Col. 3, lines 39-50 of Myers). Because the fine quantizer Q2 is quantizing the residue of the coarse quantization, there is no reason for folding stages in Myers. In Wang, the coarse ADC 203 and the fine ADC 201 each perform A/D conversion on input signal 206 in parallel. In Myers, since fine quantization is performed on the residue of the coarse quantization, the fine quantization is being performed on one coarse region only. Accordingly, there is no reason to fold N coarse regions together into one coarse region—the fine quantizer Q2 of Myers already has only one coarse region to deal with.

Also, it is respectfully submitted that the modification of the droop compensation circuit of Myers proposed by the Office Action would render the droop compensation circuit of Myers unsuitable for its intended purpose. The Office Action proposes incorporating the fine ADC 201 of Wang into the fine quantizer Q2 of Myers. However, the fine ADC 201 of Wang is designed to receive a signal such as input signal 206, which spans N coarse regions of coarse ADC 203. In contrast, the fine quantizer Q2 of Myers performs quantization of the residue of the coarse quantization. If the fine ADC 201 of Wang were incorporated into the circuit of Myers as proposed by the Office Action, it would be performing conversion on the residue, and would therefore not obtain the correct result. Accordingly, the combined circuit would not function properly, and would therefore be unsuitable for its intended purpose.

Claim 1 is respectfully submitted to be allowable for at least the reasons stated above, and notice to that effect is earnestly solicited. Claims 2, 3, and 5 are respectfully submitted to be allowable at least because they depend on Claim 1, which is proposed to be allowable.

Claim 20 is respectfully submitted to be allowable at least for reasons analogous to those stated with regard to Claim 1 above. Additionally, Claim 20 is respectfully submitted to be allowable neither Myers nor Wang, singly or together, teach or suggest the limitation, "means for calibrating the coarse channel circuit", as recited in Applicant's Claim 20. In Myers, the coarse

calibration is performed to calibrate the ramp signal which compensates for droop of the held signal. Calibration of the coarse channel itself it not performed in Myers.

For at least these reasons, it is respectfully submitted that Claim 20 is allowable, and notice to that effect is earnestly solicited.

Rejection to Claims 15 and 18 under 35 U.S.C. § 103(a)

Claims 15 and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Myers (U.S. Patent No. 5,184,127) in view of Nix et al. (U.S. Patent No. US 6,677,879). The rejection is respectfully traversed.

It is respectfully submitted that the rejection to Claim 15 is improper at least because a prima facie of obviousness has not been established. First, it is respectfully submitted that there is no motivation to modify Myers in the manner proposed by the Office Action. Second, it is respectfully submitted that the combination proposed by the Office Action would change the principle of operation of the circuit of Myers reference. Third, it is respectfully submitted that Myers and Nix do not teach or suggest all of the limitations of Claim 15.

As previously discussed, because the fine quantizer Q2 is quantizing the residue of the coarse conversion (as modified by the ramp signal), there is no reason to modify Myers to incorporate a folding architecture. In Myers, since fine quantization is performed on the residue of coarse quantization, the fine quantization is being performed on one coarse region only. Accordingly, there is no reason to fold N coarse regions together into one course region—the fine quantizer Q2 of Myers already has only one coarse region to deal with. Accordingly, there is no motivation to modify Myers in the manner suggested in the Office Action.

Further, it is respectfully submitted that the combination proposed by the Office Action would change the principle of operation of the circuit of the Myers reference. The circuit of Myers is designed for droop compensation for a subranging analog-to-digital converter. (See Col. 1, line 63 through Col. 2, line 2 of Myers). To design the circuit of Myers based on a folding ADC

architecture would require a fundamental re-working of the architecture of the circuit of Myers that would change the basic principles under which the circuit of Myers was designed to operate.

Additionally, it is respectfully submitted that Myers and Nix do not teach or suggest the limitation "a coarse channel calibration circuit that is configured to ... adjust **a parameter of the coarse channel circuit** in response to the output signal" (emphasis added), as recited in Applicant's Claim 15.

In Myers, coarse compensation is performed to change a parameter of **ramp generator 19** so that the slope of the ramp signal is calibrated. A parameter of the course quantizer Q1 is not changed, because the circuit of Myers is directed towards calibrating the ramp signal, not the analog-to-digital conversion. In contrast, Applicant's Claim 15 recites "adjust a parameter of the coarse channel circuit".

For at least the reasons stated above, it is respectfully submitted that Claim 15 is allowable, and notice to that effect is earnestly solicited.

It is respectfully submitted that the rejection to Claim 18 is improper at least because a prima facie of obviousness has not been established. First, it is respectfully submitted that there is no motivation to modify Myers in the manner proposed by the Office Action, for reasons stated with regard to Claim 15 above.

Second, it is respectfully submitted that Myers and Nix do not teach or suggest all of the limitations of Claim 18. It is respectfully submitted that Myers and Nix do not teach or suggest the limitation "adjusting a parameter of the coarse channel circuit until an output of the coarse channel circuit is calibrated in relation to the reference voltage". In Myers, the coarse calibration is performed to calibrate the ramp signal, not quantizer circuit Q1.

For at least the reasons stated above, it is respectfully submitted that Claim 18 is allowable, and notice to that effect is earnestly solicited.

New Claims 21-25

Claims 21-24 are respectfully submitted to be allowable at least because they depend from Claim 1, which is proposed to be allowable. Claim 25 is respectfully submitted to be allowable at least because it depends from Claim 15, which is proposed to be allowable.

Conclusion

It is respectfully submitted that each of the presently pending claims (Claims 1-25) are in condition for allowance and notification to that effect is requested. The Examiner is invited to contact Applicant's representative at the below-listed telephone number if it is believed that prosecution of this application may be assisted thereby. Although certain arguments regarding patentability are set forth herein, there may be other arguments and reasons why the claimed invention is patentably distinct. Applicant reserves the right to raise these arguments in the future.

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Respectfully submitted,

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